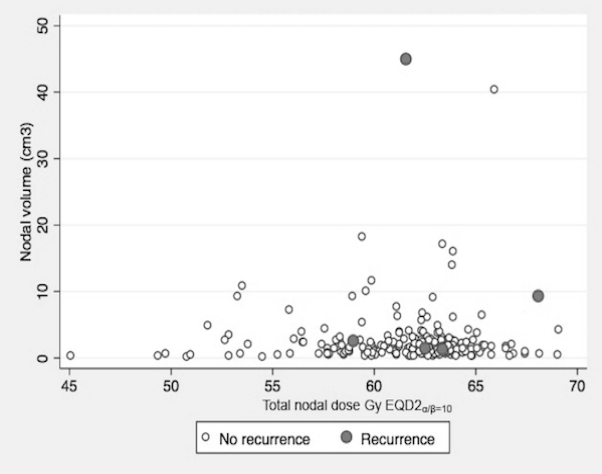
background or short axis > 10 mm on PET-CT were considered pathologic. Nodes between 5-10 mm were considered pathologic if the nodes had an irregular shape/border, had lost its architecture or were inhomogeneous. Eight patients were treated with lymphadenectomy prior to chemo-radiation and did not receive a nodal boost. The remaining 75 patients had a total number of 214 nodes boosted by EBRT (PTV-N) either as a simultaneous integrated boost (SIB) or as a sequential boost to 55-60Gy. The elective whole pelvic target (PTV-E) was treated to 45-50 Gy (Table 1). PTV-E was extended to the para-aortic region (PAN) in case of pathological nodes in the common iliac region or higher. Concomitant Cisplatin was given to 95% of the patients. MRI was performed 3 and 12 months after completion of treatment in all patients, 82/140 of the patients also had a PET-CT at 3 months follow-up. Additional imaging was performed on clinical indication. The total dose to PTV-N was calculated by rigidly registration of dose maps from elective EBRT, EBRT boost and IGABT to the planning CT scan. All doses were converted to EQD2 by the linear quadratic model (α/β = 10, repair halftime 1.5 h).

	Institute 1	Institute 2
EBRT to elective nodal region (PTV-E)	45 Gy in 25 fractions	45 Gy in 25 fractions (patients without nodal involvement) 50 Gy in 30 fractions (patients with nodal involvement)
EBRT boost to pathologic nodes (PTV-N)	Sequential 5 or 7 fractions of 2 Gy	Simultaneous integrated 60 Gy in 30 fractions
BT to high risk CTV (HR_CTV)	Option 1: PDR 2 fractions: 19.2 Gy in 32 pulses Option 2: HDR 4 fractions of 7 Gy	Option 1: PDR (node negative) 2 fractions: 17.5 Gy in 20 pulses Option 2: PDR (node positive) 2 fractions: 15 Gy in 20 pulses

Results: Pathological lymph node volume was on average 1.5 cm^3 (range 0.1-44.9) and average total dose was 62.4 Gy EQD2 (range 51.0-69.1). At a median follow-up time of 28 months (range 3-64) five recurrences were diagnosed inside PTV-N. Each recurrent node was in a different patient. There was no significant impact of nodal dose for nodes receiving above or below 60 Gy EQD2 (Fischer's exact test, *p*=0.6) nor did we find any significance of nodal volume. (Figure 1). Two of the node positive patients had a new nodal recurrence within the PTV-E. One patient had multiple recurrences involving PTV-N, PTV-E, as well as distant metastases. Two of the node positive patients had recurrences in both PTV-E and outside in the PAN region. None of the 57 node negative patients experienced nodal recurrence in PTV-E. Nine patients (6%) recurred in PAN outside PTV-E without any other sites of recurrence. Four of these patients did not have nodal disease at time of diagnosis.



Conclusions: Both micro- and macroscopic nodal control in locally advanced cervical cancer is high with the currently used treatment schedules. Recurrences are mainly located outside the PTV in the PAN region. Due to the limited number of recurrences in boosted nodes it has not been possible to establish a dose response relationship.

PD-0438

Adjuvant volumetric modulated arc therapy with vaginal cuff simultaneous integrated boost in endometrial cancer

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Purpose/Objective: Volumetric Modulated Arc Therapy RapidArc® (VMAT) has shown to be able to maintain a good toxicity profile in pelvic irradiation (PRT). We present our experience in treating pelvis for post-operative endometrial cancer (EC) with VMAT and simultaneous integrated boost (SIB) on vaginal cuff in patients (pts) unable to receive vaginal brachytherapy (VB).

Materials and Methods: From September 2011 to December 2013, fifty consecutive pts, submitted to hysterectomy with bilateral salpingo-oophorectomy and pelvic lymphadenectomy for EC, were candidate to PRT and VB +/- chemotherapy, according to stratification risk category. All the pts recruited refused VB for logistic problems or because unable or not willing to receive such treatment. After a specific informed consent, a dose of 54 Gy to the pelvis and 66 Gy to the vaginal cuff in 30 fractions was delivered with SIB-VMAT technique. A 5 mm trans-vaginal probe and Magnetic Resonance Imaging were used to define vaginal cuff. All toxicity data were collected according to CTCAE v4.0; clinical outcomes were analyzed retrospectively.

Results: Median FUP was 36 months (range, 12 to 39 months). According to FIGO 2009, the most representative stages were: I_{B1} (20% - 10/50), I_{B2} (28% - 14/50), II_{A2} (16% - 8/50), II_B (6% - 3/50), III_A (2% - 1/50), III_C (28% - 14/50). The 2-year-OS and 2-year-LC were 96% and 100%. The 3-year-OS and LC were 96% and 87%. The median DFS was 25 months (range, 12-30). No vaginal-cuff recurrence was registered. The only two loco-regional failures were pelvic-LNs metastases. Acute GI toxicity was registered as follow: G0 in 6 pts, G1 in 26 pts, G2 in 18 pts. No case of toxicity ≥ G3 was observed. Acute GU toxicity was: G0 in 5 pts, G1 in 21 pts, G2 in 24 pts. No case of toxicity ≥ G3 was observed. No late moderate - severe GI or GU toxicities were reported. A statistical correlation was found between acute G2 GI toxicity with Intestinal Cavity (IC) dose-constraints V20 Gy ≥ 30% (p-value = 0.02), V20 ≥ 40% (p = 0.02), V30 ≥ 30% (p = 0.004) and with IC-Dmax ≥ 45 Gy (p = 0.001). Regarding GU assessment, the risk to develop G2 acute toxicity is 3 times higher with adjuvant chemotherapy (p = 0.07).

Conclusions: In EC pts unable to receive VB or refusing to receive this treatment, SIB-VMAT could be a viable alternative. The present analyses showed promising findings. Further prospective studies are advocated.

PD-0439

Interstitial brachytherapy in gynaecologic malignancies with IPSA; an analysis of 100 MUPIT applications

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Purpose/Objective: Computerized Axial Tomography (CAT) scan assistance during planning Interstitial Brachytherapy (ISBT) with Oncentra based Inverse Planning and Simulated Annealing (IPSA) is used in different Institutes. ISBT has become an integral part for treatment of gynaecologic malignancies. This is an attempt to present the dose schedule used and analyse the outcome and radiation morbidity encountered.
Materials and Methods: An institutional prospective analytical study since May, 2012 to May, 2014 was undertaken. A total of 50 cases of FIGO stage IIB to IIIB including 25 post operative cases of Ca. Cervix (42 Ca. Cervix and 8 Ca.Vagina) with 100 ISBT sessions using Martinez Universal Perineal Template (MUPIT) were done. Analysis was done in the month of Sept, 2014. All the patients underwent whole pelvis External Beam Radiation Therapy (EBRT) 4500 cGy in 25 Fractions, followed by midline shielding till total dose of 5040 cGy in 28 fractions @ 180 cGy per fraction, 5 days a week, with weekly Cisplatin 40 mg/m2 prior to ISBT. A gap of 7 to10 days was allowed after completion of EBRT before attempting ISBT. The anatomical relations with Uterus, Bladder, Rectum and Intestines were noted from pre implant CT Scan of the pelvis. Gap of 7-10 days between ISBT applications was allowed and dose ranged from 800-950 cGy per session. The dose to CTV, Urinary Bladder and Rectum is reviewed, with importance to Biological Equivalent Dose (BED). RTOG/ECOG criteria were used to analyse vaginal mucosal / bowel/ bladder early and late radiation morbidity.
Results: There was only one case of hematuria following implant removal, and one case of rectal wall perforation was noted during the procedure. The mean dose to CTV D90 is 8.74Gy and 0.1cc, 1cc, 2cc of Bladder and Rectum were 8.01Gy, 6.75Gy, 6.29Gy and 7.36Gy, 6.49Gy, 6.02Gy respectably. The BED 8.74Gy for tumour is 85.8Gy (EBRT + 2 sessions of IBT) with homogeneity index of. With median follow up of 16 months (range 4 -24 months) 3 patients had grade 3 vaginal mucosal toxicity, 5 patients had grade 3 toxicity of bladder and no grade 3/4 rectal toxicity noted.
Conclusions: The procedure is well tolerated by the patients. There were no immediate post procedure complications. Total duration of the process from spinal anaesthesia to removal of template is within 3 hours. This study present the dose schedules and fractionation which has less patient distress for lying in bed with the perineal template continuously for two to three days with comparable few toxicity levels.

PD-0440

Preliminary results with intracavitary+interstitial cervical brachytherapy using same-day MRI preplanning

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Purpose/Objective: To present our first clinical experiences with combined intracavitary/interstitial (IC/IS) pulsed- dose-rate brachytherapy (PDR-BT) for locally advanced cervical cancer using same-day MRI preplanning.
Materials and Methods: Ten patients (FIGO IIB-IIIB) were treated with plastic tandem-ring (T-R, Varian) applicator using a custom made needle cap. For all patients treatment was started with pelvic±paraaortic IMRT (50.4 Gy ± 58.8 Gy simultaneously integrated boost to positive lymph nodes) with concurrent cisplatin. BT was performed on the 6th-7th week of the treatment. Two BT implants (BT1, BT2) followed by 3D SPACE MRIs with the T-R applicator in situ were performed in the same day in epidural anesthesia. The BT1 was used for trajectory planning of IS needles while BT2 comprised 35 Gy of PDR BT in 50 pulses with the implanted needles. Patients were re-planned without needles (optimized IC plan: oIC) as well. The optimization was stopped when the same D2cc dose parameters for OARs were achieved as with IC/IS approach. Dose parameters were compared by Wilcoxon signed-rank test.
Results: The number of implanted IS needles was 4±1 (Mean±SD). The depth of insertion was 25±15 mm. The majority (80%) of the needles was inserted in the postero-lateral positions of the ring. The mean D90 and D98 for HR-CTV was 90±6.2 Gy and 81.4±6.2 Gy, while for D90 IR-CTV was 69.5±2.9 Gy, respectively. The mean D2cc for OARs were the followings: bladder: 77±3 Gy, rectum: 64±3.4 Gy, sigmoid: 61.3±4.5 Gy and intestine: 63.8±6.4 Gy. Optimized IC plan significantly decreased D90 (82.5 vs. 90 Gy, p= 0.03) and D98 (73.9 vs. 81.4 Gy, p=0.01) for HR CTV compared to IC/IS at the same D2cc parameters for OARs. No serious perioperative complications were observed.
Conclusions: Combined IC/IS BT based on same-day 3D MRI trajectory pre-planning seems to be clinically feasible resulting in accurate needle placement with superior dosimetric results compared to optimized IC plan.

PD-0441

Comparison of 18F-FLT PET and 18F-FDG PET in the radiotherapy treatment of cervical cancer

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Purpose/Objective: With about 500 000 new cases every year, cervical cancer is the fourth most common cancer affecting women worldwide, and still more than half of women die from the disease. There were 2783 new cases in Poland in 2012. Tumor volume and nodal involvement are prognostic of worse outcome. The purpose of this study was to characterize the parameters of the tumor of cervical cancer obtained from FDG-PET/CT and FLT-PET/CT imaging before radiotherapy treatment planning and to assess their influence on treatment decision.
Materials and Methods: 28 patients with histological confirmed cervical cancer (27 planoepitheliale cancer, 1 clarocellulare, 2pts with G1, 13pts G2, 3pts G3, 10pts G is not known) with FIGO stage II (12pts) and FIGO III (16pts) were enrolled in this study. The mean age was 52 +/-12 (SD) years. Routinely the patients have undergone blood analysis (hemoglobin and white blood cells level) and vaginal bacteriology before treatment. They were examined with FLT PET and FDG PET.in years 2012-2014 with Gemini TF PET/CT scanner (Philips). PET scans were acquired on separate days (within one week) 60min after IV injection of 300MBq of 18F-FDG (F-con) and 300MBq of 18F-FLT (Iason). The same scan protocol and reconstruction algorithms were used for both scans. Based on MRI calculations and phantom studies a 43% threshold cut-off value was selected for metabolic GTV delineation and volume calculation. Metabolic parameters of the tumor, tumor volume and clinical parameters were assessed on every scan separately. Data were statistical analyzed using $p<0.05$.
Results: In all patients both tracers showed increased uptake in the primary tumor. The SUVmax and SUVmean were in general lower for FLT-GTV than FDG-GTV (7,3±2,18 vs 12,3±4,2; $p<0.001$ and 4,11±1,39 vs 6,9±2,39; $p<0.001$). However, in three patients SUV values for FLT-GTV were